

ORGALLOY® VIF FILMS : REDUCING PREPLANT FUMIGANT DOSAGES WITH PRESERVED EFFICIENCY

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Orgalloy® is an engineering polyamide alloy resin which presents unique barrier properties to Methyl Bromide (MB) and a wide variety of chemicals (MITC, Chloropicrin, 1,3 Dichloropropene). Orgalloy® is processed onto conventional polyethylene film equipment thus allows traditional agricultural film manufacturers to supply their customers with Virtually Impermeable Films (VIF) without specific investment.

Orgalloy® Virtually Impermeable Films are now used extensively in Europe and Japan for soil fumigation with reduced dosages of Methyl Bromide (MB) down to 50% and preserved crop yields. Orgalloy® VIF films are also currently evaluated on-field with MB by official institutes in the US and Australia. On-field testing of Orgalloy® VIF films with alternatives to MB is being performed in Europe and Japan.

Orgalloy® VIF films are 3 layers structures : PE / Orgalloy® / PE, where Orgalloy® thickness is generally around 10µ. Orgalloy® technology and Orgalloy® VIF films for soil disinfection are patented by Elf Atochem¹.

A- Orgalloy® VIF Films : - MB dosages reduction with improved CT ratios

Material	Film Thickness (µm)	Permeability to MB (g/m².h) (a)	CT Measurements² (g.h.m⁻³) (b)
LDPE	70	60 *	4170 (70g/m² MB)
PE/Orgalloy®/PE VIF	32 (10 / 12 / 10µ)	0.07 *	5410 (35g/m² MB)

Table 1 :

(a)- **According to french Standard NFT 54-195.**

Permeability of Polyethylene (PE) and Orgalloy to MB at 20°C. Evaluated by L.N.P.V.

(Laboratoire National de Protection des Végétaux) - Cenon - France.

(b)- Product Concentration x Time (CT in g.h/m³ of Methyl Bromide) obtained at 15 cm deep during 147h of treatment with the hot Methyl Bromide technique. Comparison between PE and Orgalloy barrier films with dosages of 70 g/m² and 35 g/m² of Methyl Bromide. Evaluated by L.N.P.V - June 1997 - CIREF Douville France.

- Mellon production with reduced dosage of MB and preserved yields

Material	Area	% damaged fruits	Av. mellon Weight (g)	Ratio of Marketable fruits (%)
Untreated field	12m ²	100	-	-
LDPE – MB 30kg/10a	24m ²	8	1330	98
PE / Orgalloy® / PE VIF MB 20kg/10a	24m ²	5	1420	99

Table 2 :

RYOSHO evaluation of mellon production at Miyazaki Prefectural Agricultural Center (Japan).

Fumigation in August 98, Planting Sept. 10th / Evaluation Nov. 30th, 98 (Repeated 2 times).

LDPE film : 75μ - PE / Orgalloy® / PE film : 40μ

Damage : infections, visual checking.

B- Orgalloy® VIF Films : Barrier to chemical alternatives (Chloropicrin, MITC, 1,3 D)

Material	Film Thickness (μm)	MeBr Perm. (a)	Chloropicrin Perm. (b)	MITC Perm. (b)	1,3 Dichloropropene Perm. (b)
LDPE	70	60	116	198	168
PE/ORGALLOY®/PE VIF	32 (10 / 12 / 10μ)	0.07	0.138	1.4	0.15

Table 3 :

(a)- According to NFT 54-195 and performed by LNPV.

(b)- Permeability of polyethylene and 3 layers Orgalloy VIF films to MITC, Chloropicrin and 1,3 Dichloropropene evaluated by Dr TANAKA - Kitasato University – Kanagawa – Japan.

- Herbicide Effect : Soil treatment with MITC, with and without Orgalloy® VIF film

Film	Film Thickness (μm)	MITC/Water Dosage	HERBICIDE EFFECT		
			4 days	13 days	39 days
LDPE	40	800L/10a	10	9	5
LDPE	40	120L/10a	10	9	4
PE/ORGALLOY®/PE VIF	40	800L/10a	10	9	8
PE/ORGALLOY®/PE VIF	40	120L/10a	10	9	8

Table 4 :

Evaluation conducted by RYOSHO and Japan Association for Advancement of Phyto regulators, on 7 days (from May 28th, 99).

Dosage : 40L Sodium Methyl dithio Carbamate + Water (800L = 40L + 760L Water, 120L = 40L + 120L)

Herbicide Effect : Herb density evaluated on a 0 to 10 (no visible herbs) scale on :

- *Digitaria adscendens*=crabgrass
- *Echinochloa crus-galli*=barnyardgrass
- *Cyperus microiria* Steud=chufa
- *Chenopodium album*=common lambsquarters

- *Portulaca oleracea*=common purslane
- *Persicaria longiseta*=posumbu knotweed

Conclusion :

Orgalloy® VIF films key points :

- Barrier to MB and chemical alternatives
- Fumigant dosage reduction with higher CT ratios
- Preserved yields demonstrated for 50% reduction of MB dosage
- Prevents from permeation and slow release of chemical in the near-by area during the fumigation period (possible reduction of buffer-zones)
- Cost reduction associated to fumigant dosage reduction can compensate VIF film cost
- Orgalloy® processable onto conventional PE equipment

References :

- 1 – D.Basset, M.P. Bellinger, B.Echalier, EP N°95 11 698
- 2 – D.Roumilhac, B.Simkin, J.Fritsch, “Barrier film with Orgalloy”, MBAO Conf. 98